

UTILITY PATENT APPLICATION TRANSMITTAL

See MPEP chapter 609 concerning utility patent application contents

Attorney Docket No. 0557-4730-2 CONT
First Inventor or Application Identifier YASUHIRO TABATA
Title NETWORK CONTROL METHOD AND SYSTEM

PTO
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11/12/99

APPLICATION ELEMENTS

See MPEP chapter 609 concerning utility patent application contents

ADDRESS TO:

Assistant Commissioner for Patents
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Fee Transmittal Form (e.g. PTO/SB/17)
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ACCOMPANYING APPLICATION PARTS

2. ☒ Specification Total Pages **42**
3. ☒ Drawing(s) (35 U.S.C. 113) Total Sheets **11**
4. ☒ Oath or Declaration Total Pages **2**
- a. ☐ Newly executed (original or copy)
- b. ☒ Copy from a prior application (37 C.F.R. §1.63(d))
(for continuation/divisional with box 15 completed)
- i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named
in the prior application, see 37 C.F.R. §1.63(d)(2) and
1.33(b).
5. ☒ Incorporation By Reference (usable if box 4B is checked)
The entire disclosure of the prior application, from which a copy of the
oath or declaration is supplied under Box 4B, is considered to be part
of the disclosure of the accompanying application and is hereby
incorporated by reference therein.

6. ☒ Assignment recorded @ Reel/Frame 8534/0692
7. ☐ 37 C.F.R. §3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
8. ☐ English Translation Document (if applicable)
9. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
10. ☒ Preliminary Amendment
11. ☒ White Advance Serial No. Postcard
12. ☐ Small Entity Statement(s) ☐ Statement filed in prior application, Status still proper and desired.
13. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
14. ☒ Other: Request for Priority

15. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application no.: 08/786,643
Prior application information: Examiner: WALLERSON Group Art Unit: 2722

16. Amend the specification by inserting before the first line the sentence:

☒ This application is a ☒ Continuation ☐ Division ☐ Continuation-in-part (CIP)
of application Serial No. 08/786,643 Filed on JANUARY 21, 1997

☐ This application claims priority of provisional application Serial No. Filed

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0557-4730-2 CONT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF

YASUHIRO TABATA

SERIAL NO: CONTINUATION
(OF USSN 08/786,643)

FILED: HEREWITH

FOR: NETWORK CONTROL METHOD
AND SYSTEM

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS

Please cancel Claims 1-17 without prejudice.

Please add new Claims 18-33 as follows:

--18. A network control system comprising:

a computer network;

a plurality of image forming apparatuses connected to said computer network, each image forming apparatus configured to record an image on a recording paper;

a server connected to said computer network and configured to store information items of the plurality of image forming apparatuses connected to said computer network;

a computer connected to said computer network, comprising,

a computer display configured to display the information items stored in the server, and

an input device configured to input data into the computer, said computer configured to select said image forming apparatus for recording the image which is provided by said computer by an operator selecting the information items displayed on the computer display.

19. A network control system according to Claim 18, wherein said information items include an installation location of said plurality of image forming apparatuses.

20. A network control system according to Claim 18, wherein said information items include machine models, presence or absence of specification data, and existence or non-existence of malfunctions in said plurality of image forming apparatuses.

21. A network control system according to Claim 19, wherein said information items further include machine models, presence or absence of specification data, and existence or non-existence of malfunctions in said plurality of image forming apparatuses.

22. A network control system according to Claim 18, wherein said server further stores for each of the plurality of image forming apparatuses a layout of an operation panel.

23. A network control system according to Claim 19, wherein said server further stores for each of the plurality of image forming apparatuses a layout of an operation panel.

24. A network control system according to Claim 20, wherein said server further stores for each of the plurality of image forming apparatuses a layout of an operation panel.

25. A network control system according to Claim 21, wherein said server further stores for each of the plurality of image forming apparatuses a layout of an operation panel.

26. A network control system comprising:
computer network means;

a plurality of image forming means connected to said computer network means, each image forming means for recording an image on a recording paper;

server means connected to said computer network means for storing information items of the plurality of image forming means connected to said computer network means;

computer means connected to said computer network means, comprising,

display means for displaying the information items stored in the server means, and

input means for inputting data into the computer means, said computer means selecting said image forming means for recording the image which is provided by said computer means by an operator selecting the information items displayed on the display means.

27. A network control system according to Claim 26, wherein said information items include an installation location of said plurality of image forming means.

28. A network control system according to Claim 26, wherein said information items include machine models, presence or absence of specification data, and existence or non-existence of malfunctions in said plurality of image forming means.

29. A network control system according to Claim 27, wherein said information items further include machine models, presence or absence of specification data, and existence or non-existence of malfunctions in said plurality of image forming means.

30. A network control system according to Claim 26, wherein said server means further stores for each of the plurality of image forming means a layout of an operation panel means.

31. A network control system according to Claim 27, wherein said server means further stores for each of the plurality of image forming means a layout of an operation panel means.

32. A network control system according to Claim 28, wherein said server means further stores for each of the plurality of image forming means a layout of an operation panel means.

33. A network control system according to Claim 29, wherein said server means further stores for each of the plurality of image forming means a layout of an operation panel means.--

REMARKS

Favorable consideration of this application, in view of the following comments and as presently amended, is respectfully requested.

The present application is a continuation of co-pending parent U.S. Application Serial No. 08/786,643. The present application set forth new Claims 18-33 for examination. Those claims recite subject matter such as discussed on pages 16 and 17 of the present specification, as one example, and particularly with respect to a computer network including a server, a plurality of image-forming apparatuses, and a computer all connected to a computer network.

In view of the present Preliminary Amendment, it is believed that the present application is now in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

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TITLE OF THE INVENTION

NETWORK CONTROL METHOD AND SYSTEM

BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to a network control method and system which connects a computer with an image forming apparatus via a network, performs various kinds of controlling of an image forming apparatus from the
10 computer, and is configured to grasp operational state data from the image forming apparatus.

Discussion of the Background

In the recent years, computers have become much more commonplace in an office environment. Documents
15 developed on a computer are often either output in hard-copy form from a printer or sent by computer correspondence to some distant place. Likewise, the documents received by computer correspondence are output by a printer connected to a computer and so on.

20 Copying machines are marketed as an independent office automation apparatus, and thus are often viewed as "stand-alone" devices. However, consistent with office automation initiatives, a number of multi-functional

machines having both a copying function and a printer function which that are both connectable to a computer are increasing. Consequently, as the number of apparatuses for outputting documents (e.g., printer, facsimiles, and copying machines) increases in an office, so does the required space for hosting the increasing number of apparatuses.

In light of the trend for increased computer automation, and the associated space requirements, multi-functional machines that perform the functions of multiple traditional stand-alone devices are also increasing in number. Multi-functional machines are attractive because only one device needs to be installed rather than a plurality of apparatuses.

One approach for consolidating computer resources is to connect a printer for common use by a plurality of computers via a networks such as a LAN (Local Area Network). Furthermore, for example, the systems described in Japanese Laid-open Patent Publication No.2-16076/1990 and Japanese Laid-open Patent Publication No.3-63161/1991 are well known related art.

And further, in Japanese Laid-open Patent Publication No. 2-67167/1990, a plurality of printers are connected to a network and additionall/, the name of each

printer or the like can be read out on the network. A device for seeking suitable processing "efficiency information" obtained from a plurality of printers on the network is disclosed in Japanese Laid-open Patent

- 5 Publication No. 2-12323/1990 and Japanese Laid -open Patent Publication No. 6-143755/1994. An automatic selection of the printer which achieves an output demand of the computer by exchanging information between the printer and the computer via the network is also
- 10 disclosed in Japanese Laid-open Patent Publication No.- 173173/1992.

- However, regarding a combination of a computer and a printer, or a computer and a multi-functional machine, presently, these devices are considered distinct devices
- 15 which are independently developed and manufactured, and therefore, mutual relationships and interfaces therebetween have not been fully identified. Needless to say, because both computer/printer and computer/multi-function units have to be connected to each other, the
- 20 above-mentioned combination at least requires an interface so as to be compatible with one another.

Except special devices, a computer generates its own printing instruction through computer software. For example, instructions for printing in WINDOWS® by

Microsoft Corp. are common regardless of the model of the printer. Namely, regardless of function and ability of the printer, if the printers are compatible with one another, the respective printers output sheets according
5 to common printing instructions provided by the computer.

In some advanced software applications, the number of printing conditions such as a number of printed sheet, a printing area in a sheet, an adjustment of printing layout or the like increases. However, these printing
10 conditions exist regardless of how the function is achieved in the printer and the multi-functional machine.

Further, a printer, a facsimile, a copying machine, and a multi-functional machine are often connected to a computer as a terminal. However most recently, many of
15 the copying conditions as seen in usual copying machines are not configured to operate with printing instructions from the computer. For example, in the device disclosed in Japanese Laid-open Patent Publication No. 7-20976/1995, the contents of which are incorporated herein
20 by reference, filed by the present applicant, there is proposed to display both the operating condition of the multi-functional machine connected to the computer and the operating condition of the multi-functional machine registered in the computer. However, in the above

apparatus, a technical field and a point of view are different than the present invention. Differences are evident in the displaying of only the operating condition, and the graphical displaying of the operating

5 panel of the image forming apparatus such as a multi-functional machine or the like (as to be discussed with the present invention) which is chosen from the operating condition as a pre-registered value displayed in a display of the computer.

10 In such manner as stated above, there are some problems to be solved in the prior art, as identified by the present inventor, as stated below.

1. In a conventional computer, printer, multi-functional machine and the like interconnected in a

15 network-based system, a computer cannot conveniently dispatch print instructions regardless of the function of the printer or other network terminal.

2. Even though the network terminal equipment connected to the computer is recognized in the background

20 art, the condition of the network terminal is not recognized beforehand. Furthermore, even though the printer is connected to the network with the computer, a printing operation is disabled when the image forming

apparatus is operating normally, malfunctioning or when the image forming apparatus is otherwise busy.

3. If an operating panel of the image forming apparatus cannot be seen by an operator, the operator
- 5 cannot know whether the requested operating image forming condition is practicable. Even though the image forming apparatus connected to the network is displayed on the display of the computer, an operator is obliged to search the location where the outputting apparatus is located if
- 10 the installed location of the apparatus is unknown to the operator. Furthermore, if the apparatus is installed in a distant place from the computer, it takes a long time for the operator to fetch the printed sheet, and total time for printing turns out to be long as a result
- 15 thereof.

4. Even though the network is constructed to display on the image forming apparatus display connected thereto and to display the operating panel on the display of the image forming apparatus which is chosen by an operator to
- 20 input the image forming condition, if only one apparatus is displayed from among a plurality of executable apparatuses, it is not convenient when another apparatus is located at a place closer than the image forming apparatus.

5. And further, a problem arises when no executable apparatus exists when a plurality of image forming conditions are input, and printing (image forming) is thus not possible at all. Even though there is an image forming apparatus which satisfies other image forming conditions, the satisfaction of an operator becomes lowered inevitably if there is no image forming condition which the operator particularly requires. Furthermore, assuming that an image forming apparatus is retrieved which nearly satisfies the image forming condition input by the computer, there are no countermeasures for satisfying the image forming condition(s) which is not met by the retrieved image forming apparatus.

6. Even though the apparatus which satisfies the image forming condition as sufficiently as possible and the apparatus having many high priority image forming conditions are displayed, it is impossible to determine to what extent the desired printing quality will be realized, because it is not clear which conditions input by an operator are met and not met.

SUMMARY OF THE INVENTION

The present invention has been made in consideration of such problems, and accordingly it is an object of the

present invention to provide a network control system capable of printing a document and a drawing which are output from a computer utilizing the network control system's own image forming apparatus functions.

- 5 It is another object of the present invention to provide a network control system capable of utilizing its own printing function of the image forming apparatus as a terminal device.

- 10 It is still another object of the present invention to provide a network control system capable of recognizing a list of office automation terminals having respective printing functions available for use from a computer and capable of judging whether or not printing instructions are accepted by a terminal equipment.

- 15 It is still another object of the present invention to provide a network control system capable of choosing an image forming apparatus available for printing immediately in response to a printing instruction.

- 20 It is still another object of the present invention to provide a network control system configured to conveniently allow an operator to judge printing conditions including selection of an image forming apparatus from which to print.

It is still another object of the present invention to provide a network control system capable of improving printing producibility.

It is still another object of the present invention
5 to provide a network control system capable of realizing improved print producibility in which an image forming apparatus connected to the network retrieves whether the image forming condition input in a computer is executable, and capable of improving print producibility
10 by displaying a retrieving result.

It is still another object of the present invention to provide a network control system capable of supporting the operator's selection of the most suitable image forming apparatus by displaying the apparatus that most
15 completely satisfies the image forming condition, even though the apparatus does not satisfying all aspects of the input image forming condition.

It is still another object of the present invention to provide a network control system capable of retrieving
20 an image forming apparatus offering high user satisfaction and displaying an indication thereof.

It is still another object of the present invention to provide a network control system capable of inputting an image forming condition again by using an operating

medium of an image forming apparatus which is retrieved by a computer, and capable of executing a printing operation as satisfactorily as possible for an operator.

BRIEF DESCRIPTION OF THE DRAWINGS

5 A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, 10 wherein:

FIG. 1 is a block diagram of a computer network of an embodiment of the present invention;

FIG. 2 is a perspective view illustrating a computer and a multi-functional machine according to the present 15 invention;

FIG. 3 is a block diagram of a computer and a multi-functional machine according to the present invention;

FIG. 4 is an illustrative diagram showing a state of a display on an operational panel in a multi-functional 20 machine according to the present invention;

FIG. 5 is an illustrative list displayed on a computer display where the list includes information of

kinds of machines and related location, identification and status fields;

FIG. 6 is an illustrative diagram displayed on a computer display showing an operation panel in a list

5 format;

FIG. 7 is a flowchart showing an input procedure for selecting a final kind of machine from among image forming apparatuses available for printing;

FIG. 8 is an illustrative diagram showing data items
10 input to a list which is requested by an operator including a priority order of the data items;

FIG. 9 is an illustrative diagram showing a result of retrieval excluding lower priority image forming apparatuses;

15 FIG. 10 is an illustrative diagram showing a result of displaying image forming apparatuses in an order based on a number of input items satisfied by the respective image forming apparatuses; and

FIG. 11 is a flowchart of a procedure of selecting a
20 requested image forming apparatuses after inputting items.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, and more particularly to Figures 1-4 thereof there is illustrated a first embodiment of the present invention.

First Embodiment

FIG. 1 is a schematic illustration of a network constructed with a LAN 100 (Local Area Network). FIG. 2 is an illustration of an example of a computer (e.g., personal computer) that connects to the LAN, where the computer includes a keyboard and a display, and a multi-functional machine that functions as a printer and a copying machine. FIG. 3 is a functional block diagram of respective internal portions of the computer and the multi-functional machine as shown in FIG. 2. FIG. 4 is an illustration of an operation panel of the multi-functional machine.

As is apparent from FIG. 1, the network includes the LAN 100 (such as a Novell Ethernet LAN) which interconnects a server 1 (e.g., an OptiPlex GL 5133 sold by Dell Computer Corp.), computers 3 and 4 (e.g., personal computers, PCs such as Aptiva model PCs offered by IBM corporation), a printer 5 (e.g., PC LASER SP10PS

offered by Ricoh Company Ltd.), a photocopying machine 6 (e.g., Spirio 1500 offered by Ricoh Company Ltd.), and a multi-functional machine 7 (e.g., IMAGIO MF200 offered by Ricoh Company Ltd.) that includes a copying function, a facsimile function, scanner, etc. Furthermore, while only selected network components are shown in Figure 1, it stands to reason that other network elements may also connect to the LAN 100. The server 1 holds information regarding which terminals (e.g., network components 3 -7) are connected to the network, and also holds data unique to each of the terminals (e.g., address data, including local and Internet Protocol, IP, addresses) at the same time.

As shown in Figures 2 and 3, the PC 3 is provided with a controlling device (controller) 10 (e.g., a motherboard having a central processing unit thereon as well as RAM, ROM, and specialized circuitry including application specific integrated circuits, ASICs), a display 8, a keyboard 9, a mouse 9a, and a memory 11, and is connected to the multi-functional machine 7 via a LAN interface (I/F) 12 (or alternatively a dedicated local interface or proprietary interface). While in this embodiment, an input device of the computer is constructed with the keyboard 9 and the mouse 9a, but

other input devices such as a touch panel for inputting data to the computer by the operation on the display 8 may be employed, and other display devices (e.g., plasma displays) etc. may be substituted for the components shown in Figures 2 and 3. In addition to the above, the multi-functional machine 7 is provided with a controlling device 13 (e.g., a processor-based controller), an image forming apparatus 14, an operation panel 15, a memory 16 and an interface (I/F) 17, and all of those latter elements are respectively connected to the controlling device 13, and also connected to the computer 3 via the interface 17 as shown in FIG. 3.

As shown in Figure 4, the operation panel 15 (Figure 3) of the multi-functional machine 7 preferably includes a print button 18, a ten-key arrangement 19 (e.g., for inputting a number of sheets to be copied) having a clear-key 20 and an interrupting-key 21, a copy image density adjusting button 22 and associated display, a series-copy selecting button 23, where "series copy" signifies a continuous copy for alternate pages), a duplex-copy selecting button arrangement 24, 2-in-1 and 4-in-1 selecting button arrangement 25 for implementing copying two or four originals onto one copy sheet with reduced copy size, a sort button 26, a staple button 27,

a copy size changing (enlargement/reduction) button arrangement 28, an automatic copy size changing button 29, and an automatic sheet selecting button 30, or the like.

- 5 Additionally, a digital copying machine according to the present invention may include a subset of the above functions or additional functions. One such additional function is an image editing function which signifies, for example, an electronic sort, an image conversion for
- 10 length and breadth, a translating copy (output of a computer which reads an English document by a scanner, translates into Japanese, and adds the Japanese meaning to the English sentence word by word), a shadowing function, an outlining function (blanking on the center),
- 15 a type style conversion, etc. Still further, the present invention accommodates color copying machines and color printers, which include various kinds of functions regarding color options. An operation panel 15 for these auxiliary functions is located on the front surface
- 20 of the machine's upper part as shown in FIG. 2. Furthermore, in the multi-functional machine 7 of the present embodiment, a graphical image of the operation panel 15 having approximately the same layout and design is memorized in the memory 16.

A graphic layout of the operation panel 15 is stored in a memory of the server 1 (not shown) on the network 2. Preferably, the information inherently associated with a respective terminal required to be stored in the memory of the server 1 is stored when the multi-functional machine 7 is first connected to the network 2, by a service engineer or an operator. Alternatively, at the time of retrieving the inherent information from the computer 3 (for example), an operation panel can be constructed so as to take out the information on the operation panel from the memory 16 in the multifunctional machine 7 via the network 100 if necessary. The layout of the operation panel 15 of the multi-functional machine 7 is memorized in the memory 16 as the same layout or the approximately same layout in the present embodiment. However, only the items of the image forming condition inherent in the multi-functional machine 7 are displayed in a list.

As is apparent from the foregoing description, the server 1 is constructed such that the server 1 memorizes the items of the image forming conditions inherent in all of the image forming apparatus connected to the network 2, such as the copying machine 6, the printer 5, the multi-functional machine 7 (and other devices such as a

facsimile device, or the like), and the information of machine model such as name of the machine model, installing place, presence or absence of the specification data, and existence or non-existence of a malfunction in the apparatus (or system), and when an operator requires to print document or figure to be made by the computer 3 or 4, the image forming apparatus available for printing can be known by indicating that in the list as will be discussed in reference to FIG. 5.

- 10 Returning to the operation panel of Figure 4, an image of which is displayed at a selecting computer 3 or 4, the term '2-in-1' on a graphic operation panel represents an image forming apparatus operation capable of forming two original images of the same size onto one recording sheet. Usually, in order to form an image at the same time on a selected sheet, an original image is reduced to a required size. For example, suppose the size of an original image is A4, the two original images can be copied onto A4 by reducing the size of the
- 15 original image to A5 respectively. In practice, the A5 size image thus reduced has to be rotated by 90°, and consequently, a digital copying machine or a printer is preferable for performing this operation. Furthermore, the term '4-in-1' represents an operation for copying
- 20

four original images onto one recording sheet at the same time, and is accomplished in a manner similar to that discussed with respect to the "2-in-1" operation.

The 'C' mark in the clear-key button of the ten-key arrangement 19 has a function of returning an inputted numerical value to an initial value by use of a clear-key 20. A mark '=' on an interrupting-key 21 indicates a function of printing another job, thus interrupting a present job, before the present count value of the printing counter does not reach the predetermined count value. Regarding an adjustment of the image density, there is known a method of notifying an operator which degree of density is selected, in such a manner as that, when a density displaying part 22 is pressed down, a density scale-bar beneath the part 22 is illuminated. By operating a plus-key and a minus-key at a right part thereof, the illuminated density scale-bar can be moved to right and left direction, and the copy density of the image can be decided. It is possible also to commonly use the ten-key arrangement 19 for the purpose of enlarging or reducing an image size as a matter of course in cooperation with enlargement/reduction button arrangement 28.

Generally speaking, implementing the functions on the operation panel of figure 4 is accomplished by pressing a selecting button at the left side of the respective input items on the operation panel for the

5 desired function. When a print button 'P' 18 is pressed after finishing the selection of an inputting condition in the form of numerical value, or selecting the items thereof, a printing instruction is outputted.

Furthermore, in the case of performing the inputting

10 operation from the computer 3, for example, the operation panel is displayed on the display 8 of the computer 3, for example. Based on a selection by the operator of the computer 3, a printing instruction is transmitted to the multi-functional machine 7, from the computer 3 or 4

15 which is inputted by selecting the key position or the button position by the mouse 9a. Still further, in the case of using the touch panel, it is sufficient for an operator only to press the corresponding position with a finger.

20 A state of ordinary use or a malfunction state of the image forming apparatus selected by the operation is displayed on the operational panel. The above functional/nonfunctional states thus displayed can be known by an operator of the computer in the same way as

in the case of the usual printer and the multi-functional machine. In other words, the color of the print button 18 is changed to red if the apparatus is in use, or in the case of a display panel which is not color panel, the operator can be informed that the apparatus is in use by the reverse display indication (black to white, or vice versa) or the like. Furthermore, machine errors such as 'paper empty', 'toner empty', 'paper jamming', etc., are independently displayed by illuminating the respective signs at a lower part of right side of the indication panel, if any. The above states are displayed on-line, and thereby, the latest information can be known by an operator.

FIG. 5 shows an example of an information list of the machine models which is stored in a look-up table format in memory of the server 1. Respective entries in the look-up table are grouped according to respective attributes of the respective terminals on the LAN 100. For each terminal, attributes include data fields for "NAME OF THE MODEL", "INSTALLMENT PLACE", "NAME OF THE DEPARTMENT", "OCCUPIED(?)/NOT OCCUPIED" status, and "PRESENCE/ABSENCE OF FAILURE". Associated data for each of the terminals are stored in respective data fields,

thereby keeping an up-to-date log of status information about each of the respective terminals.

A method of selecting the aforementioned image forming apparatus which is located close by to the
5 operator and satisfies desired printing conditions (as will be explained hereinafter). Referring to FIG. 5, when an operator selects a most suitable image forming apparatus from the operation panel displayed in a display
8 of the computer 3, for example, by the mouse 9a, the
10 operation panel information of the selected image forming apparatus is displayed on the display 8 of the operator's own computer 3 (via a message transfer from the server
1). In response, the operator can input the image forming condition to be printed, for example, by the
15 mouse 9a (and/or the keyboard 9, or other suitable data input device). In such manner as stated above, the operator can operate the image forming apparatus remotely, as easily as if operating the respective
apparatuses (a copying machine 6, a printer 5, a multi-
20 functional machine 7, and a facsimile-device, etc.) locally.

The term "using-state" information, as used herein, signifies status information about whether the image forming apparatus is put in the usable state at present

time, and whether the operator can select the apparatus for instant use (e.g., without queuing the request). Furthermore, it is also possible to display that, if the apparatus is being used, how many copies are presently
5 set to be copied and of those how many copies have already finished copying as of the accessed time. Thereby, the operator can judge whether or not the apparatus is to be brought to an available state for using shortly thereafter, or whether the wait for the
10 apparatus is too long of a time for use in the present scenario.

The phrase "failure-state information", as used herein, signifies the information which informs the operator of the functional state of the apparatus,
15 including specific states such as "the apparatus cannot be used because of paper jamming", and "the apparatus cannot be used because of insufficient toner, and therefore the toner has to be replenished in the apparatus". Other specific functional states about the
20 specific apparatuses are available to the operator as well, including "the apparatus cannot presently be used because it is presently in an abnormal operational state".

Furthermore, as is apparent from FIG. 5, such information as mentioned above further includes the information of the installation place (i.e., location) for the machine, a name of the building, installation
5 floor, model name of the image forming apparatus, and other information such as the cognizant department for the machine.

The operator selects two models of the image forming apparatus among the apparatuses available for use in the
10 network 100 viewing the state displayed as shown in FIG. 5. For example, suppose that the operator selects RICOFY FT5500@, and RICOFY FT8100 @ both installed near the operator's working place, which is for example in the "first building" on the "third floor". Final selection
15 of the apparatus to be made cannot yet be identified because a plurality (two) apparatuses are currently selected. Therefore, before making the final selection, another display, as shown in Figure 6, the respective functions offered by the two candidate apparatuses are
20 displayed in summary form to the operator, thereby facilitating the operator's final selection of desired apparatus.

In FIG. 6, when the operator requires any one of the image forming apparatuses, the operator selects it in the

same way, for instance, by use of the mouse 9a.

Therefore, the operation panel layout as shown in FIG. 4 is displayed on the display 8.

Figure 7 is a flowchart of a process for selecting a
5 finally selected image forming apparatus from plural
candidate image forming apparatuses. The process begins
in step S701 where the operator selects a most suitable
image forming apparatus from the screen displayed in FIG.
5. The process then proceeds to step S702 where a
10 controller checks whether or not there is an apparatus
connected to the network 100. If the response to the
inquiry in step S702 is negative, the process proceeds to
step S703 where the controller 10 displays a message "no
corresponding image forming apparatus" is present. If
15 the response in step S702 is affirmative, the process
proceeds to step S704 where the controller displays an
indication that at least one image forming apparatus is
presently available for use. The process then proceeds
to step S705 where an inquiry is made by the controller
20 10, checking for whether there is a plurality of image
forming apparatuses. If the response to the inquiry is
affirmative, the process proceeds to step S706 where a
list of input items of the selected image forming
apparatuses is displayed, as shown in FIG. 6.

Subsequently, the process proceeds to step S707 where the controller 10 checks whether or not there exists an image forming apparatus to be finally used. If the response to the inquiry in step S707 is affirmative, the process

5 proceeds to step S708 where an image of the operation panel 15 of the finally selected image forming apparatus is displayed by the controller 10 on the display 8. Thereafter the operator inputs numerical values or the like as the input items by the ten-key pad arrangement

10 19, in step 709. However, if in step S707 the response to the inquiry is negative the process returns to step S702. If the response to the inquiry in step S705 is negative, the process flows to steps S708 and S709 and previously described and the process ends. According to

15 this process, the operator executes the selection process by conveniently viewing options presented by the display 8.

Second Embodiment

The aforementioned first embodiment is an example of

20 displaying the model of the apparatus connected to the LAN 100, and it adopts the method of narrowing down the apparatuses thereof in a step-by-step manner. However, the second embodiment is an example implementation of the

present invention which selects a suitable apparatus by retrieving whether there exists an image forming apparatus which satisfies the printing criteria requested by the operator. The operation displaying screen in

5 this case like that shown in FIG. 8. Namely, in this embodiment, the items required by the operator are inputted into a visible attribute selection table as shown in FIG. 8. Items required by the operator are input by the operator and represented on the display 8 as

10 indicated by the "o" symbols in FIG. 8. Functions that are absolutely required are displayed on the screen as a priority at the same time. Alternatively, a particular priority order may be inputted by the operator as numbers as 1, 2, 3, ... After completing the inputting

15 operation, the controller 10 issues retrieving instructions, and the controller 10 displays a list of image forming apparatuses which satisfy the condition to be required by the operator from among the apparatuses connected to the LAN 100. The same format of the list

20 of FIG. 5 may be used for the present list. The most convenient apparatus for the operator is finally selected because the apparatus in this list satisfy all of the desired printing conditions. When the apparatus is selected finally, as explained in the first embodiment,

the operation panel 15 of the selected apparatus is displayed on the display 8. This operation panel is the same one as that of the panel shown in FIG. 4, and when the panel is displayed. Subsequently, the panel display
5 is available for accepting the input data, required numerical values or the like as the next necessary items.

However, it is not always probable that there exists an apparatus satisfying all of the required input items on some occasions. If the controller displays that
10 there is no corresponding apparatus, the operator then inputs for a second time a subset of the features previously input by the operator. This process of limiting the number of requested features repeats until an apparatus is suitably identified.

15 Subsequently, the required input items are displayed, and at the same time the priority order is inputted as shown in FIG. 8. By thus pre-setting the above condition in the apparatus, when the input items of low priority are omitted from the retrieving items, the
20 required apparatus model corresponding thereto can be found on some occasions, thereby expediting the selection process.

For instance, with respect to an example of the input items as shown in FIG. 8, although the stapling

function thereof is required, the priority order is low nevertheless, and thereby the above condition is omitted from the selection criteria. If there exists an image forming apparatus that meets the priority criteria, but
5 not the stapling criteria, the above state of existence is displayed thereon as the retrieving result.

At this time, the displaying method as shown in FIG. 9 may be convenient for the operator. Namely, as the retrieval result of omitting the items of low priority,
10 displaying 'The input items of your request are as follows.', the controller 10 causes a display of the requested image forming apparatus and the priority order thereof, and further displaying, 'As the retrieving result, there was no apparatus satisfying all of the
15 input items of your request'. However, the apparatuses which satisfy the input items of high priority order are as follows: 'Please select one of the apparatuses which you want.', the controller shows a name of the apparatus model, an installing place, a name of the department,
20 whether the apparatus is being used or not, whether the apparatus has failed or not, and whether the apparatus is selectable or not.

The operator omits the apparatuses that are in use (occupied) and the apparatus having a malfunction (toner

empty) among the apparatuses in the list, and thereafter selects RICOPY FT8100@ listed on the second from the top.

Subsequently, an operation panel 15 of the apparatus of RICOPY FT8100@ as shown in FIG. 4 is displayed on the
5 display 8 of the computer 3. The operator inputs the numerical value or the like of the input items by viewing the indication on the screen 8.

When there are no apparatuses satisfying the printing condition, even though the operator considers
10 the low priority acceptable, the computer 3 displays an indication to this effect and the controller 10 redisplayes the screen of FIG. 8. Namely, such information may be used as reference values for later narrowing down the input conditions by clarifying what
15 had previously been input.

Figures 10 and 11 will be used to describe a modification of the second embodiment which is a device and method for displaying the image forming apparatus in the order of a number of input items which further
20 satisfies the operator's request instead of the previous priority order approach. For example, suppose the operator inputs four input items as shown in FIG. 9, the retrieved result is displayed in the order of a number of the items which satisfies the required printing condition

of the operator, as shown in FIG. 10. Although the input items are displayed in the order of the number thereof (e.g., all four conditions satisfied, three conditions satisfied...), it is sufficient to display
5 only the one of the largest number. Therefore, it may be allowed to display only the result of the items in FIG. 10.

FIG. 11 is a flowchart showing the above described procedure which begins in step S1101 when the input items
10 are selected. The process then proceeds to step S1102 where the controller 10 checks whether or not an image forming apparatus satisfying the input items exists. If the response to the inquiry in step S1102 is affirmative, the process proceeds to step S1103 where an indication is
15 displayed indicating that there is a relevant image forming apparatus and then the process proceeds to step S1107 (as will be discussed). If the response to the inquiry in step S1102 is negative, the process proceeds to step S1104 where an inquiry is made regarding whether
20 the operator input a priority order. If the response to the inquiry in step S1104 is affirmative, the process proceeds to step S1105 where the controller 10 displays the image forming apparatuses satisfying the priority order. However, if the answer to the inquiry in step

S1104 is negative, the controller 10 displays a message 'There is no relevant apparatus' and returns to step 1101. On the other hand, when the processes of the above-mentioned steps 1103 and 1105 are finished, the
5 process flows to step S1107 where the operator is prompted to indicate if there is any desired image forming apparatus.

If the response to the inquiry in step S1107 is affirmative, the process flows to step S1108, where the
10 operation panel 15 of the image forming apparatus selected in step S1109 is displayed on the display 8, and input items are entered in step S1110.

However, if the response to the inquiry in step S1107 is negative, the process returns to step S1101 and
15 waits for the selection of the inputted items.

This invention may be conveniently implemented using a conventional general purpose digital computer programmed according to the teachings of the present specification, as will be apparent to those skilled in
20 the computer art. Appropriate software coding can readily be prepared by skilled programmers based on the teachings of the present disclosure, as will be apparent to those skilled in the software art. The present invention may also be implemented by the preparation of

application specific integrated circuits or by interconnecting an appropriate network of conventional component circuits, as will be readily apparent to those skilled in the art.

- 5 Obviously, numerous additional modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the present invention may be practiced otherwise than as
- 10 specifically described herein.

WHAT IS CLAIMED AS NEW AND IS DESIRED TO BE SECURED BY
LETTERS PATENT OF THE UNITED STATES IS:

1. A network control system comprising:
 - a computer network;
 - 5 an image forming apparatus connected to said computer network and configured to record an image on a recording paper, comprising,
 - an operational control device configured to produce a control instruction for adjusting features of
 - 10 the image recorded on the recording paper,
 - a memory configured to hold display information representative of an image of said operational control device, and
 - a controller configured to provide said display
 - 15 information in response to a request, and configured to operate said image forming apparatus based on said control instruction from said operational control device or other devices connected to said network;
 - a computer connected to said network, comprising, - 20 a computer display, and
 - an input device configured to input data into the computer, said computer configured to select said

image forming apparatus for recording the image which is provided by said computer,

a request mechanism configured to request said display information from at least one of a server
5 connected to said computer network and said image forming apparatus, and configured to display said display information on said computer display, and

a feature select mechanism that provides the control instruction to said image forming device
10 corresponding to features of said display information selected at said computer.

2. A network control system according to claim 1, wherein said request mechanism is configured to display on said display a list identifying said image forming
15 apparatus and other image forming apparatuses, said request mechanism comprising an apparatus display state mechanism configured to display on said computer display an operational state of said image forming apparatus and said other image forming apparatus at a same time.

20 3. A network control system according to claim 2, wherein said apparatus display state mechanism is configured to display at least one of a state of failure and a state of occupation corresponding to an operational status of said image forming apparatus.

4. A network control system according to claim 1,
wherein said request mechanism is configured to display
said display information on said computer display as a
graphical image that corresponds in appearance with a
5 layout of said operational control device.

5. A network control system according to claim 1,
wherein said request mechanism is configured to display
as a list input items of said display information.

6. A network control system according to claim 4,
10 wherein said request mechanism is configured to display
an installation location of said image forming apparatus
as part of said display information.

7. A network control system according to claim 5,
wherein said request mechanism is configured to display
15 an installation location of said image forming apparatus
as part of said display information.

8. A network control system comprising:
a computer network;
an image forming apparatus connected to said network
20 comprising,

recording means for recording an image on a
recording paper, and

operating means for receiving and responding to
a print instruction regarding an image forming condition

of the image to be recorded by said recording means, said operating means having a displayed image;

a computer connected to said network, comprising,
a display that displays said displayed image,

5 and

inputting means for inputting said image forming condition in the computer on the basis of said displayed image; and

executing means for holding attributes including the
10 displayed image of operating means of said image forming apparatus, for retrieving said image forming condition from said inputting means of said computer, for displaying on said display an indication of said image forming condition, and for sending the print instruction
15 including said image forming condition to the image forming apparatus.

9. A network control system according to claim 8, wherein:

said display being configured to display respective
20 indications of all of image forming apparatuses connected to the network capable of executing said image forming condition;

said inputting means for receiving an input signal selecting one of said respective image forming apparatuses identified on said display; and

said executing means for holding attributes of
5 respective of said all of image forming apparatuses connected to the network, and for sending said print instruction to the one of said respective image forming apparatuses selected by said inputting means.

10 10. A network control system according to claim 8, wherein:

said executing means is for determining whether if image forming apparatus is capable of executing each aspect of said image forming condition and for identifying at least one image forming apparatus capable
15 of executing a portion of said image forming condition; and

said display being configured to display an indication of said at least one of said respective image forming apparatuses capable of executing a portion of
20 said image forming condition.

11. A network control system according to claim 8, wherein:

said executing means is for determining whether no image forming apparatus is capable of executing each

aspect of said image forming condition and for
identifying at least one of said respective image forming
apparatuses capable of executing a largest portion of
said image forming condition previously indicated as
5 being a high priority image forming condition feature;
and

said display being configured to display an
indication of said at least one of said respective image
forming apparatuses capable of executing a largest
10 portion of said image forming condition previously
indicated as being the high priority image forming
condition feature.

12. A network control system according to claim 8,
wherein:

15 said executing means is for determining whether no
image forming apparatus is capable of executing each
aspect of said image forming condition;

said display is configured to display as said
display image an image of said operating means; and

20 said inputting means for modifying said image
forming condition.

13. A network control system according to claim 9,
wherein:

said executing means is for determining whether no image forming apparatus is capable of executing each aspect of said image forming condition;

said display being configured to display as said
5 display image an image of said operating means; and
said inputting means for modifying said image forming condition.

14. A network control system according to claim 10,
wherein:

10 said executing means is for determining whether no image forming apparatus is capable of executing each aspect of said image forming condition;

said display being configured to display as said display image an image of said operating means; and

15 said inputting means for modifying said image forming condition.

15. A network control system according to claim 10,
wherein said display being configured to display a model name and a satisfactory/unsatisfactory state of
20 said image forming condition.

16. A method for controlling a network having a computer and an image forming apparatus connected thereto, comprising the steps of:

selecting from a display a suitable image forming apparatus;

determining if a plurality of suitable image forming apparatuses are present;

5 displaying a list of input items of suitable image forming apparatuses if said plurality of image forming apparatuses are determined to be present and selecting one of the suitable image forming apparatuses as a finally selected image forming apparatus;

10 displaying an operation panel image of the finally selected image forming apparatus;

selecting an image forming condition at said computer based on said operation panel image; and

15 recording at said image forming apparatus an image on recording paper based on said image forming condition selected at said computer.

17. A method for controlling a network having a computer and a plurality of image forming apparatuses connected thereto, comprising the steps of:

20 displaying at said computer a plurality of input items corresponding to an image forming condition, said input items including a priority identifier;

selecting at said computer a portion of said plurality of input items;

determining whether at least one of said plurality of image forming apparatuses satisfies all of the plurality of input items and if so, selecting a final image forming apparatus that satisfies all of the

5 plurality of input items;

displaying an indication of another plurality of said image forming apparatuses having an attribute corresponding to a priority identifier, if none of said plurality of image forming apparatuses satisfy all of the

10 plurality of input items;

selecting as the final image forming apparatus one of said another plurality of said image forming apparatuses having an attribute corresponding to the priority identifier when none of said plurality of image

15 forming apparatuses satisfy all of the plurality of input items; and

recording at said final image forming apparatus an image on recording paper based on said image forming condition.

ABSTRACT OF THE DISCLOSURE

A network control system and method that outputs documents and figures from an image forming apparatus based on an image forming condition as provided by a
5 computer. An operation panel is configured to prepare an indication as to how the image will be prepared. A memory holds display information representative of an appearance of the operation panel, and a network server holds respective display information for each candidate
10 image forming device connected to the network. A computer is connected to the image forming apparatus via a network and displays the display information representative of the appearance of the operation panel. Any one of the image forming apparatus on the network may
15 be selected by the computer when issuing a print instruction from the computer. The image forming apparatus selected by the computer transmits display information towards the computer (perhaps by way of the server), by retrieving the display information from
20 memory. The computer inputs an image forming condition based on the displayed information corresponding to the operation panel so that the print instruction sent from the computer to the selected image forming apparatus will include the image forming condition.

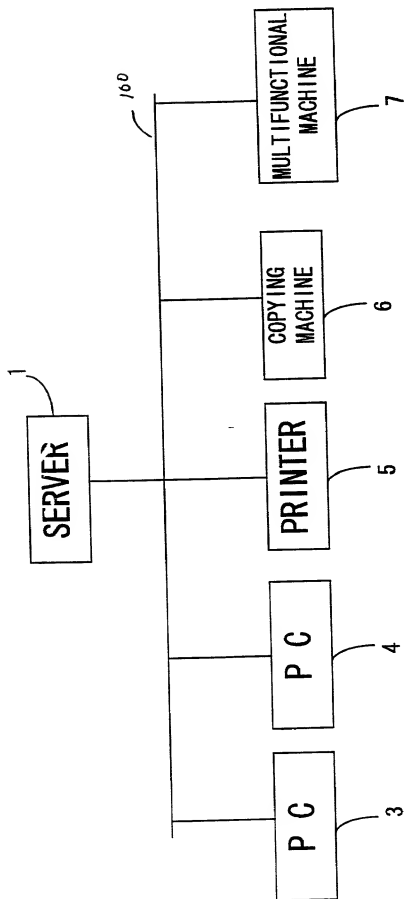


FIG. 1.

FIG. 2

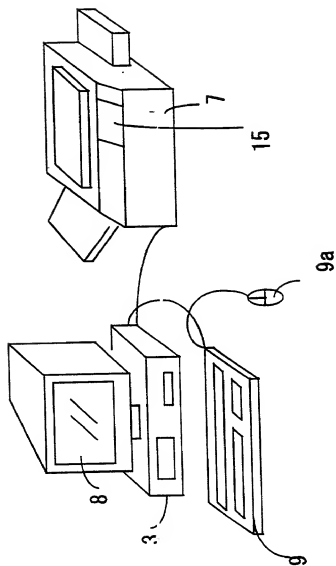


FIG. 3

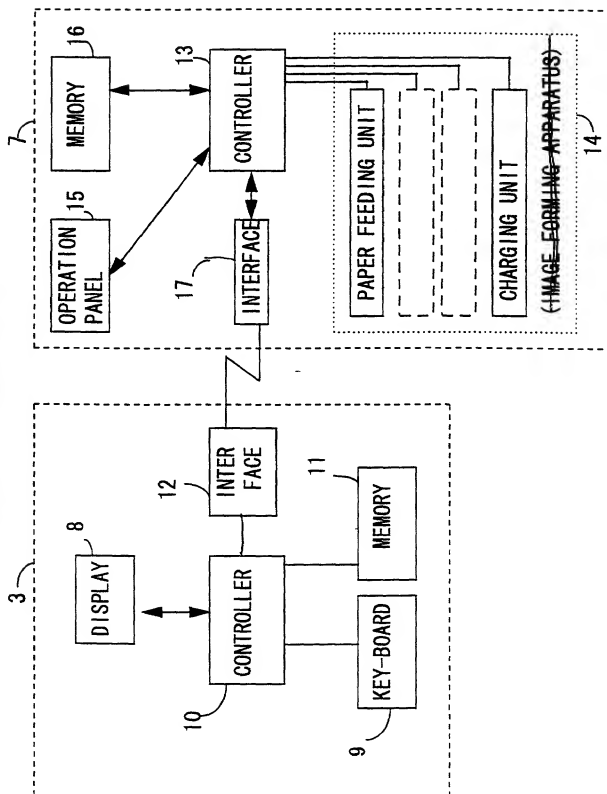


FIG. 4

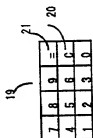



FIG. 5

| NAME OF THE MODEL | INSTALLMENT PLACE | NAME OF THE DEPARTMENT | OCCUPIED (?) /NOT OCCUPIED | PRESENCE/ABSENCE OF FAILURE |
|-------------------|--|---|----------------------------|-----------------------------|
| RICOPY FT500 | FIRST BUILDING, THIRD FLOOR - WEST | GENERAL AFFAIRS DEPARTMENT | OCCUPIED | |
| RICOPY FT8100 | FIRST BUILDING, THIRD FLOOR - EAST | PERSONNEL AFFAIRS DEPARTMENT | | |
| IMAG10 MF150 | FIRST BUILDING, SECOND FLOOR - CENTER | ACCOUNTING AFFAIRS DEPARTMENT | | TONER EMPTY |
| IMAG10 MF530 | FIRST BUILDING, SECOND FLOOR - EAST | ACCOUNTING AFFAIRS DEPARTMENT | OCCUPIED | |
| PRETER 550 | FIRST BUILDING, FOURTH FLOOR - WEST | DESIGN SECTION, IN DESIGN DEPARTMENT | | |
| RIFAX L80 | FIRST BUILDING, THIRD FLOOR - CENTER | DESIGN SECTION, IN DESIGN DEPARTMENT | | |

FIG. 6

PLEASE SELECT SUITABLE ONE FROM THE IMAGE FORMING APPARATUS MENTIONED BELOW.

| SELECTION  <input type="checkbox"/> <input type="checkbox"/> | | |
|---|--|---|
| INPUT ITEMS | RICOPY ET6500 | RICOPY ET8100 |
| STANDARD INPUT ITEM (*) | <input type="radio"/> | <input type="radio"/> |
| BOTH-SURFACES COPY SELECTION | <input type="radio"/> | <input type="radio"/> |
| ENLARGEMENT COPY SELECTION | <input type="radio"/> STEPWISE ENLARGEMENT | <input type="radio"/> (ZOOMING ENLARGEMENT) |
| REDUCTION COPY SELECTION | <input type="radio"/> STEPWISE REDUCTION | <input type="radio"/> (ZOOMING REDUCTION) |
| AUTOMATIC ENLARGEMENT/REDUCTION | — | <input type="radio"/> |
| AUTOMATIC PAPER SELECTION | — | <input type="radio"/> |
| PAPER SIZE SELECTION | <input type="radio"/> | <input type="radio"/> |
| PAGE SERIES COPY SELECTION | <input type="radio"/> | <input type="radio"/> |
| 2-in-1/4-in-1 SELECTION | — | <input type="radio"/> |
| SORTER | <input type="radio"/> | <input type="radio"/> |
| STAPLE | <input type="radio"/> | <input type="radio"/> |

(*) STANDARD INPUT ITEM INCLUDES MATTERS MENTIONED BELOW.
A NUMBER OF COPIED SHEETS, IMAGE DENSITY ADJUSTMENT, PRINTING INSTRUCTION, AND CLEAR SWITCH

FIG. 7

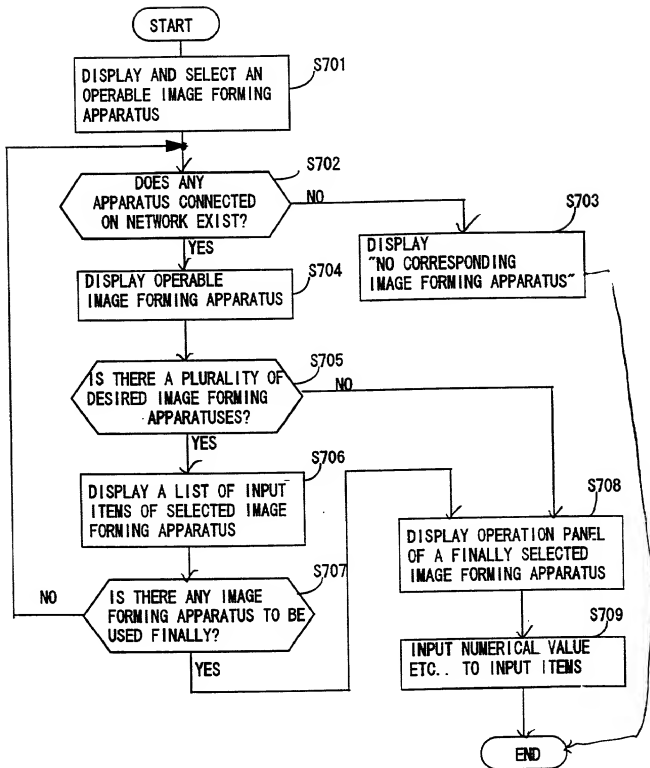


FIG. 8

| INPUT ITEMS | PRESERVE/ABSENCE OF DESIRE | PRIORITY ORDER |
|---|----------------------------|----------------|
| BOTH-SURFACES COPY SELECTION | | |
| ENLARGEMENT COPY SELECTION (STEPWISE ENLARGEMENT) | o | o |
| ENLARGEMENT COPY SELECTION (ZOOMING ENLARGEMENT) | | |
| REDUCTION COPY SELECTION (STEPWISE REDUCTION) | | |
| REDUCTION COPY SELECTION (ZOOMING REDUCTION) | | |
| AUTOMATIC ENLARGEMENT/REDUCTION | | |
| AUTOMATIC PAPER SELECTION | o | |
| PAPER SIZE SELECTION | | |
| PAGE SERIES COPY SELECTION | | |
| 2-in-1/4-in-1 SELECTION | | o |
| SORTER | o | |
| STAPLE | o | |

FIG. 9

YOUR REQUESTED INPUT ITEMS ARE AS FOLLOWS.

| INPUT ITEMS | PRESENCE/ABSENCE OF DESIRE | PRIORITY ORDER |
|------------------------------|----------------------------|-----------------------|
| BOTH-SURFACES COPY SELECTION | <input type="radio"/> | <input type="radio"/> |
| AUTOMATIC PAPER SELECTION | <input type="radio"/> | |
| SORTER | <input type="radio"/> | <input type="radio"/> |
| STAPLE | <input type="radio"/> | |

AS A RESULT OF RETRIEVAL, THERE IS NO MACHINE MODEL SATISFYING ALL OF REQUESTED INPUT ITEMS. HOWEVER, THE MODELS SATISFYING THE INPUT ITEMS OF HIGH PRIORITY ORDER ARE AS FOLLOWS. PLEASE SELECT ONE MODEL YOU WANT TO USE.

| NAME OF THE MODEL | INSTALLMENT PLACE | NAME OF THE DEPARTMENT | OCCUPIED/NOT-OCCUPIED | PRESENCE/ABSENCE OF FAILURE | SELECTION |
|-------------------|--|----------------------------------|-----------------------|-----------------------------|-----------------------|
| RICOPY FT5500 | FIRST BUILDING, THIRD FLOOR - WEST | GENERAL AFFAIRS DEPARTMENT | OCCUPIED | | <input type="radio"/> |
| RICOPY FT8100 | FIRST BUILDING, THIRD FLOOR - EAST | PERSONNEL AFFAIRS DEPARTMENT | | | |
| IMAGIO MF150 | FIRST BUILDING, SECOND FLOOR - CENTER | ACCOUNTING AFFAIRS DEPARTMENT | | TONER EMPTY | |
| IMAGIO MF530 | FIRST BUILDING, SECOND FLOOR - EAST | ACCOUNTING AFFAIRS DEPARTMENT | OCCUPIED | | |

FIG. 10

(1) THERE IS NO MACHINE MODEL SATISFYING ALL OF FOUR ITEMS.

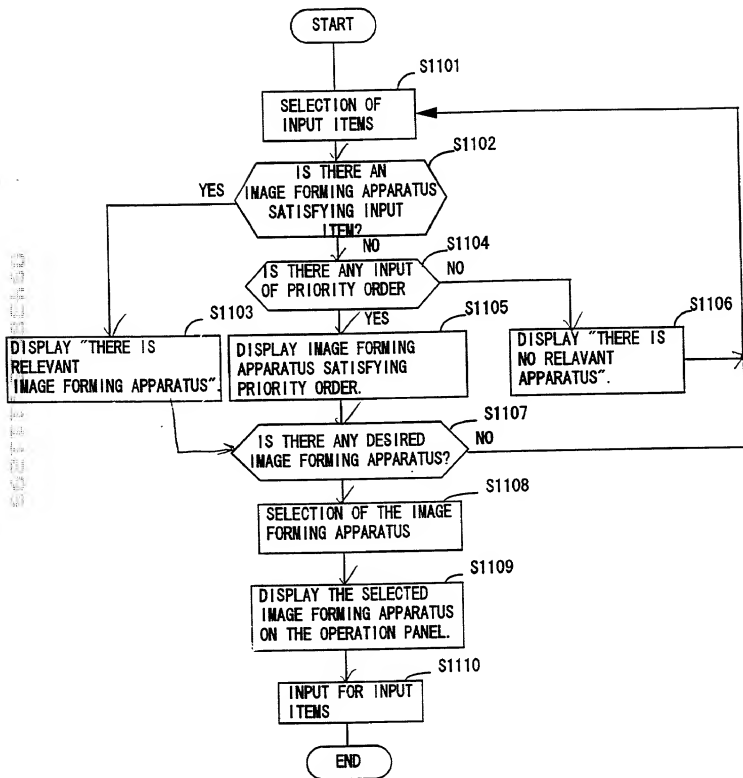
(2) MODELS SATISFYING THREE ITEMS

| NAME OF THE MODEL | INSTALLMENT PLACE | NAME OF THE DEPARTMENT | OCCUPIED/NOT-OCCUPIED | PRESENCE/ABSENCE OF FAILURE | SELECTION |
|-------------------|---------------------------------------|---------------------------------|-----------------------|-----------------------------|-----------|
| RICOPY FT5500 | FIRST BUILDING, THIRD FLOOR - WEST | GENERAL AFFAIRS DEPARTMENT | OCCUPIED | | |
| RICOPY FT6100 | FIRST BUILDING THIRD FLOOR - EAST | PERSONNEL AFFAIRS DEPARTMENT | | | |

(3) MODELS WHICH MEET TWO ITEMS

| NAME OF THE MODEL | INSTALLMENT PLACE | NAME OF THE DEPARTMENT | OCCUPIED/NOT-OCCUPIED | PRESENCE/ABSENCE OF FAILURE | SELECTION |
|-------------------|--|----------------------------------|-----------------------|-----------------------------|-----------|
| IMAGIO MF150 | FIRST BUILDING, SECOND FLOOR - CENTER | ACCOUNTING AFFAIRS DEPARTMENT | | TONER EMPTY | |
| IMAGIO MF530 | FIRST BUILDING, SECOND FLOOR - EAST | ACCOUNTING AFFAIRS DEPARTMENT | OCCUPIED | | |

FIG. 11



Declaration, Power Of Attorney and Petition

Page 1 of 2

WE (I) the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

NETWORK CONTROL METHOD AND SYSTEM

the specification of which

☒ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and amended on _____.

☐ was filed as PCT international application

Number _____

on _____,

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

| Application No. | Country | Day/Month/Year | Priority Claimed |
|-----------------|---------|----------------|---|
| 03-006767 | JAPAN | 18/01/1996 | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| _____ | _____ | _____ | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| _____ | _____ | _____ | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| _____ | _____ | _____ | <input type="checkbox"/> Yes <input type="checkbox"/> No |

We (I) hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

| | |
|-------------------------------|------------------------|
| _____ (Application Number) | _____ (Filing Date) |
| _____ (Application Number) | _____ (Filing Date) |

We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

| Application Serial No. | Filing Date | Status (pending, patented, abandoned) |
|------------------------|-------------|--|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

And we (I) hereby appoint: Norman F. Oblon, Registration Number 24,618; Marvin J. Spivak, Registration Number 24,913; C. Irvin McClelland, Registration Number 21,124; Gregory J. Maier, Registration Number 25,599; Arthur I. Neustadt, Registration Number 24,854; Richard D. Kelly, Registration Number 27,757; James D. Hamilton, Registration Number 28,421; Eckhard H. Kuesters, Registration Number 28,870; Robert T. Pous, Registration Number 29,099; Charles L. Gholz, Registration Number 26,395; Vincent J. Sunderdick, Registration Number 29,004; William E. Beaumont, Registration Number 30,996; Steven B. Kelber, Registration Number 30,073; Robert F. Gause, Registration Number 27,295; Jean-Paul Lavalleye, Registration Number 31,451; Timothy R. Schwartz, Registration Number 32,171; Stephen G. Baxter, Registration Number 32,884; Martin M. Zoltick, Registration Number 35,745; Robert W. Hahl, Registration Number 33,893; Richard L. Treanor, Registration Number 36,379; Steven P. Weihrich, Registration Number 32,829; John T. Goolkasian, Registration Number 26,142; Marc R. Labgold, Registration Number 34,651; William J. Healey, Registration Number 36,160; Richard L. Chinn, Registration Number 34,305; Steven E. Lipman, Registration Number 30,011; and Jacques M. Dulin, Registration Number 24,067; our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to the firm of OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C., whose Post Office Address is: Fourth Floor, 1755 Jefferson Davis Highway, Arlington, Virginia 22202.

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

YASUHIRO TABATA
NAME OF FIRST SOLE INVENTOR

Yasuhiro Tabata
Signature of Inventor

January 30, 1997
Date

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